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**Jonas et al.**

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(54) **ENCLOSURE LOCKING SYSTEM**

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(51) **Int. Cl.**

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| ***E05B 65/06*** | (2006.01) |
| ***H02G 1/00*** | (2006.01) |
| ***E05C 19/00*** | (2006.01) |

(52) **U.S. Cl.**
CPC ..... ***H02G 1/00*** (2013.01); ***E05C 19/003*** (2013.01); *Y10T 70/5106* (2015.04); *Y10T 70/5168* (2015.04); *Y10T 70/5566* (2015.04)

(58) **Field of Classification Search**
CPC ..... H02B 1/28; H02B 1/30; H02B 1/38; H02B 1/40; H02G 1/00; E05B 65/0888; A47B 81/00; A47B 95/008; A47B 96/067; E05C 19/003; E05C 19/005; E05C 19/18; E05C 19/184; E05C 19/186; E05C 19/188; Y10T 70/5544; Y10T 70/5168; Y10T 70/5199; Y10T 70/5566; Y10T 70/5097; Y10T 70/5093; Y10T 70/5102; Y10T 70/5106
USPC ..... 70/32, 54–56, 94, DIG. 64, DIG. 65, 70/DIG. 66, 93, 101, 135, DIG. 12, 164, 70/77–80, DIG. 56, 18; 292/256.6, 292/DIG. 21, 205, 259 R, 262, 338, 339, 292/258, 288, 289; 312/100, 245
See application file for complete search history.

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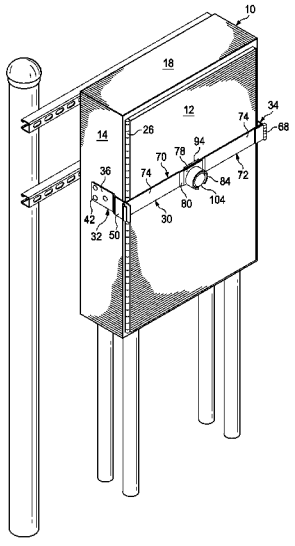
(57) **ABSTRACT**

An enclosure and enclosure locking system for an enclosure having an opening with a door or access panel utilizes first and second side mounting brackets that are each coupled to opposite portions of the enclosure. First and second locking strap members overlie the door or access panel when the door or access panel is in the closed position when in a locked condition. A staple assembly is used for receiving a shackle or lock pin of a pad lock and also for coupling the strap members together and locking the locking system **30** in a locked condition.

**18 Claims, 12 Drawing Sheets**



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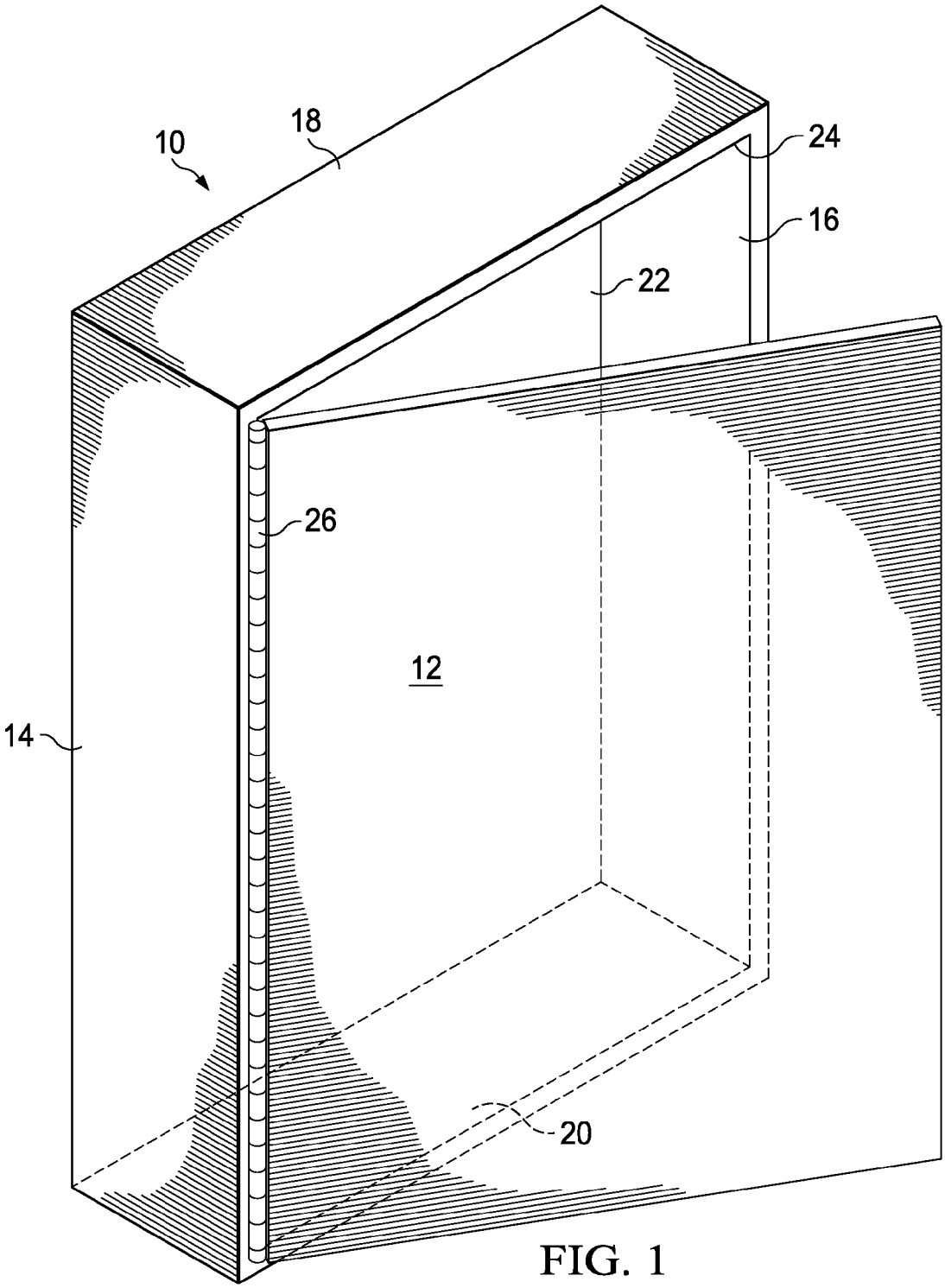


FIG. 1

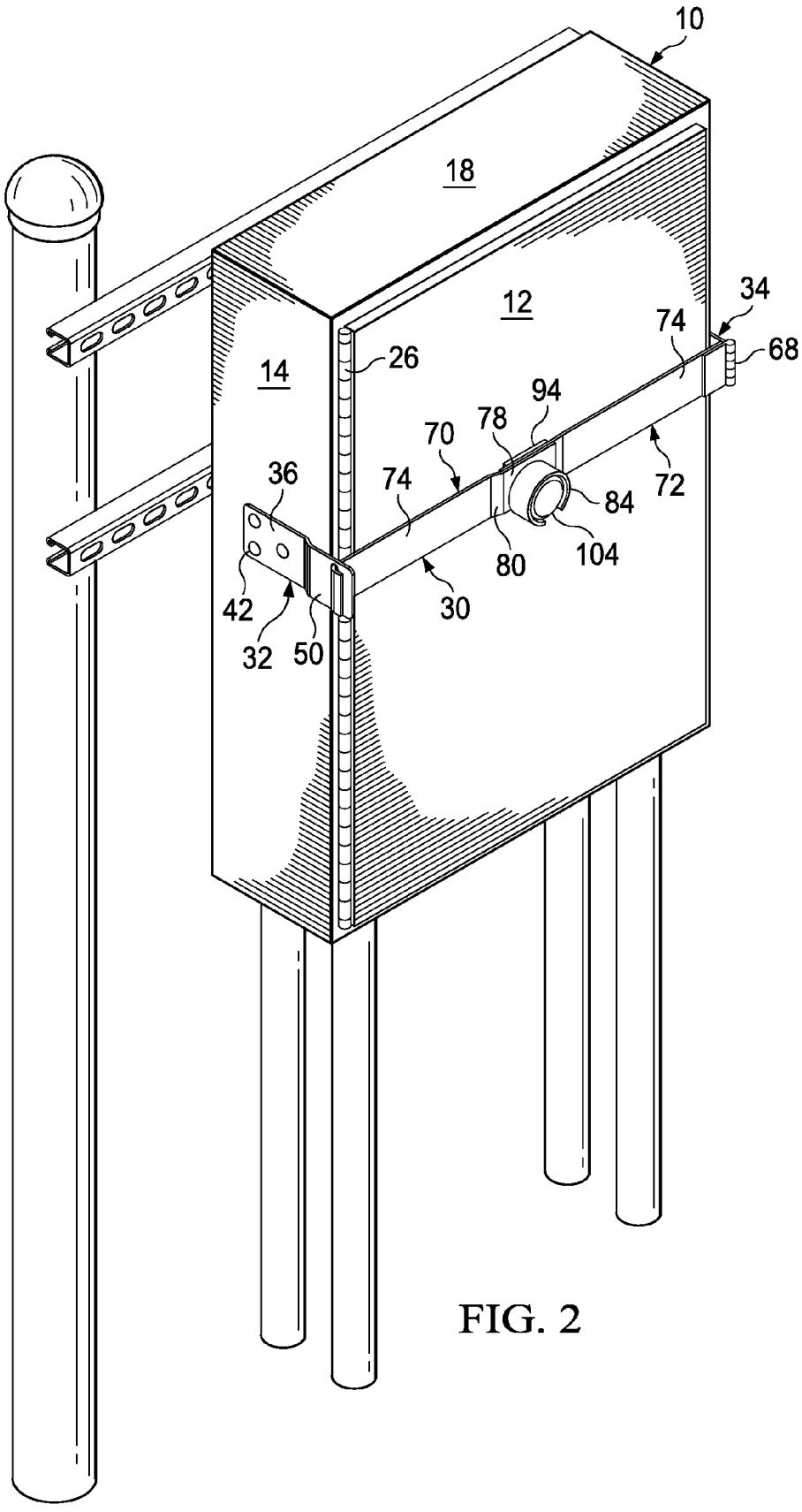


FIG. 2

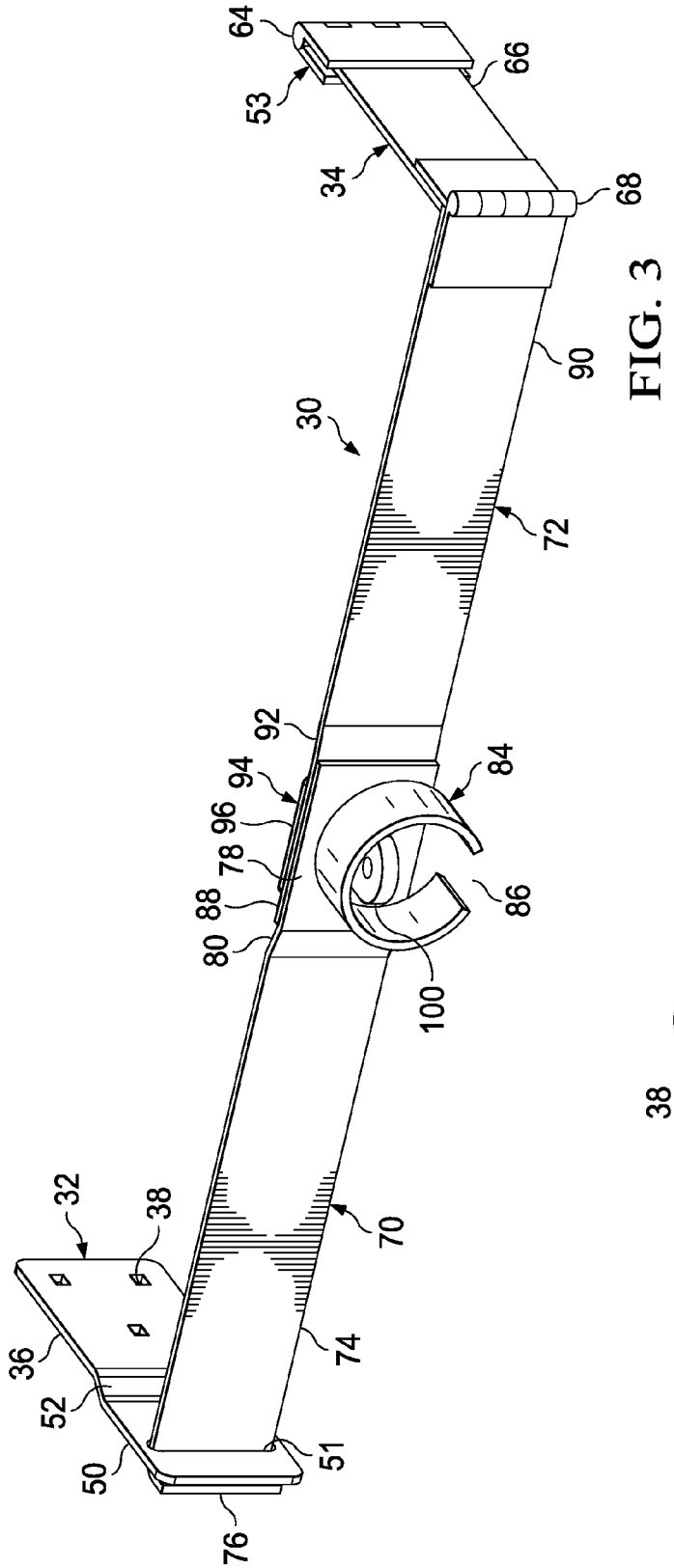
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FIG. 3

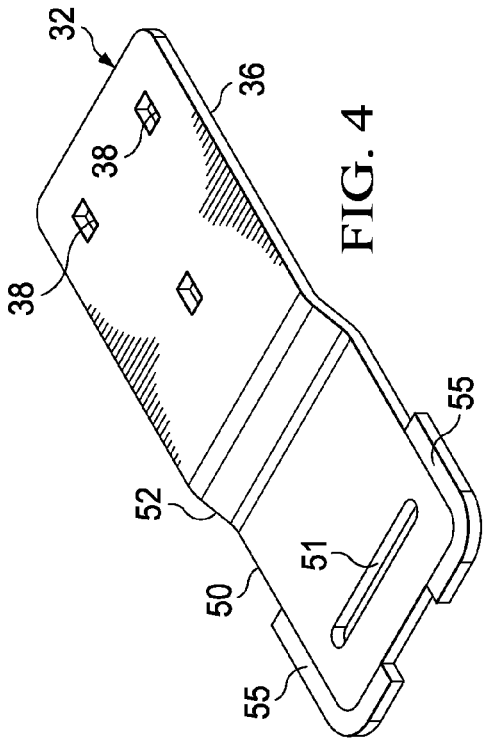
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FIG. 4

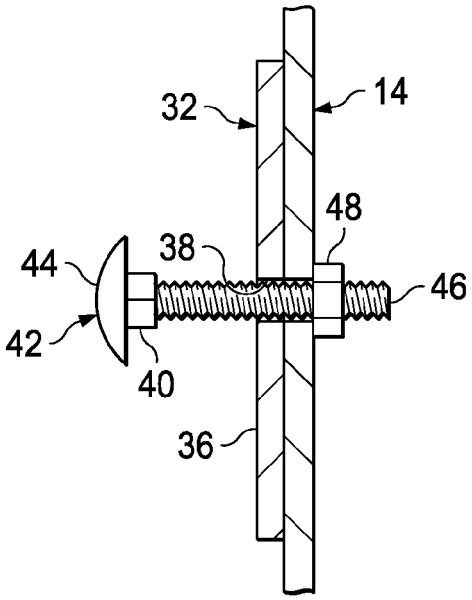


FIG. 5

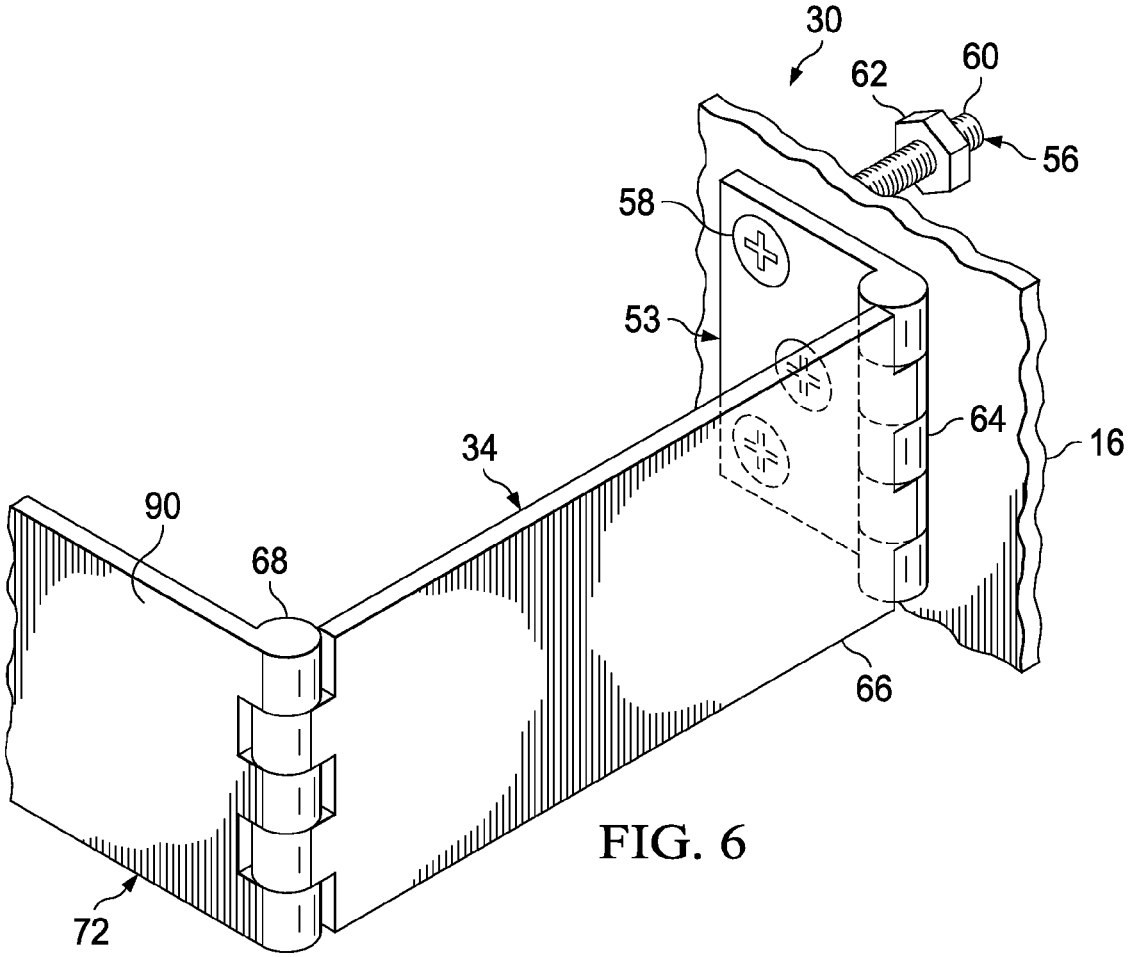


FIG. 6

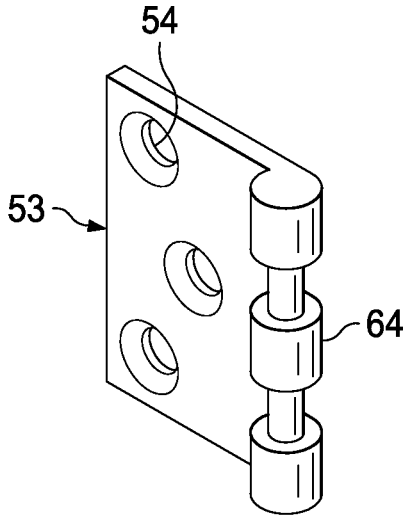


FIG. 7

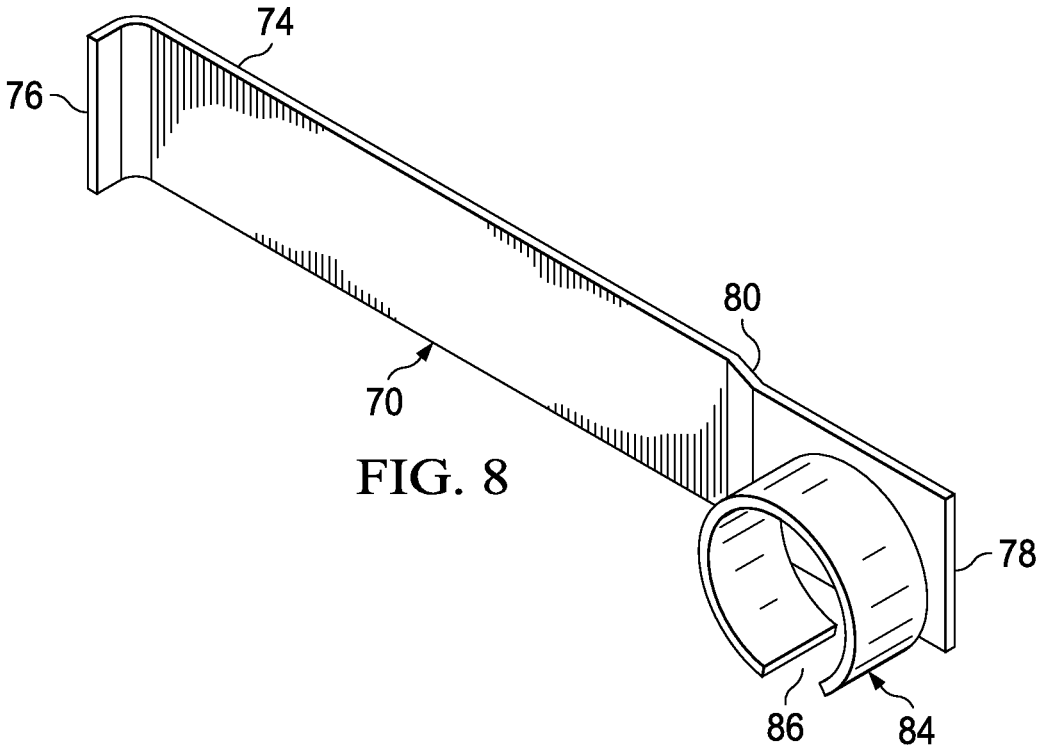


FIG. 8

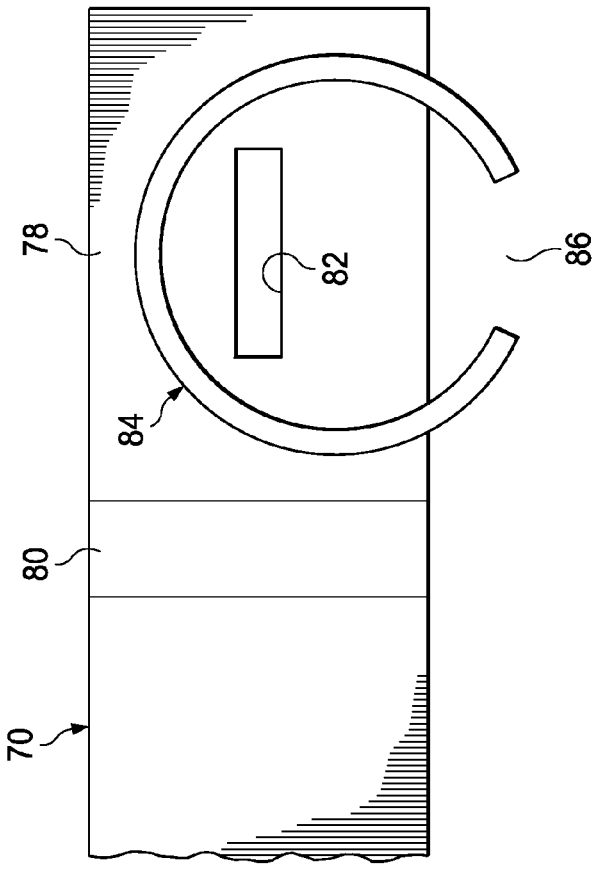


FIG. 9

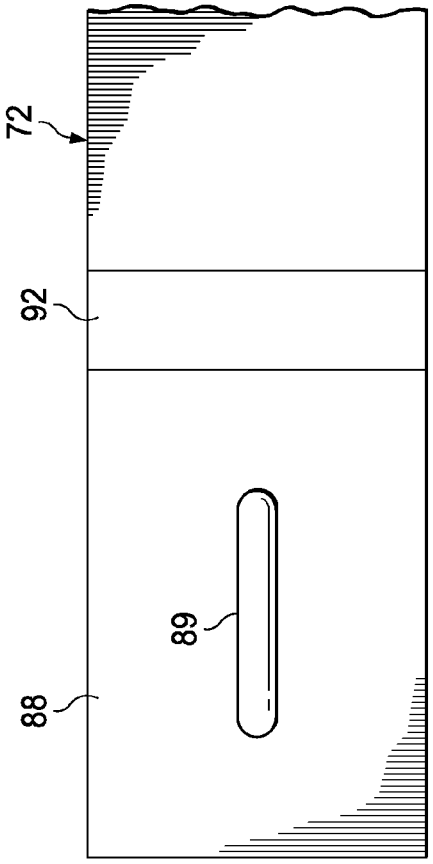


FIG. 10

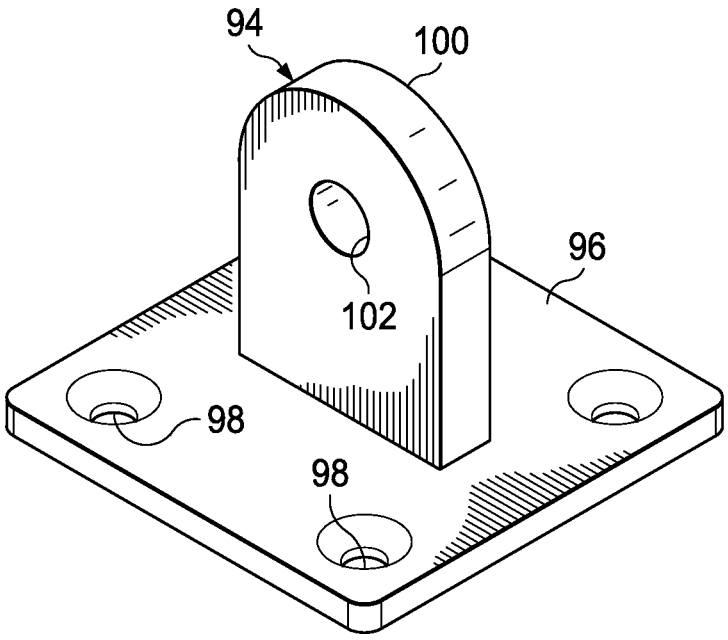


FIG. 11

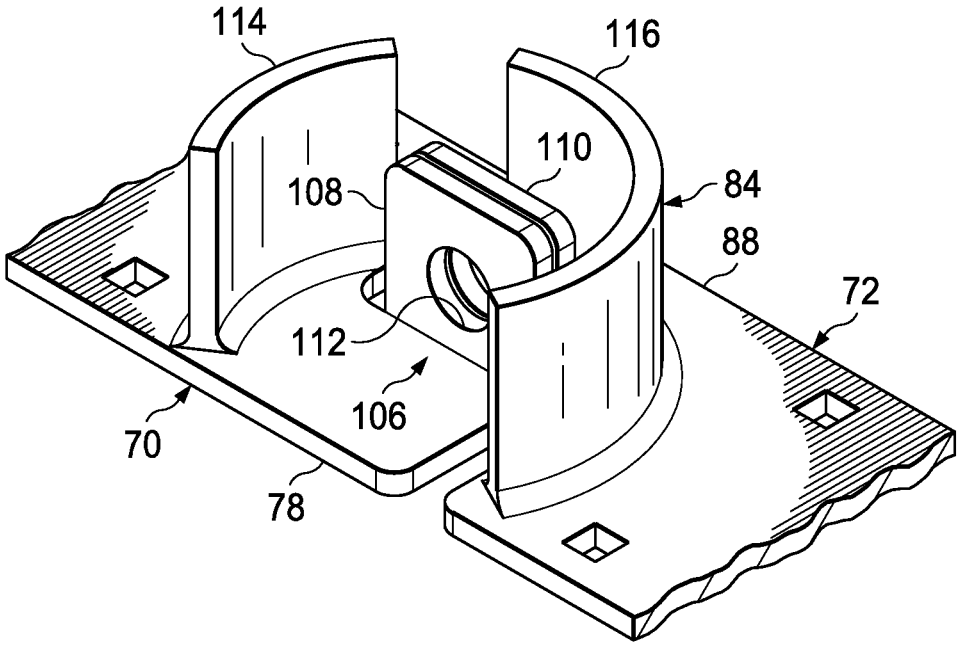


FIG. 12

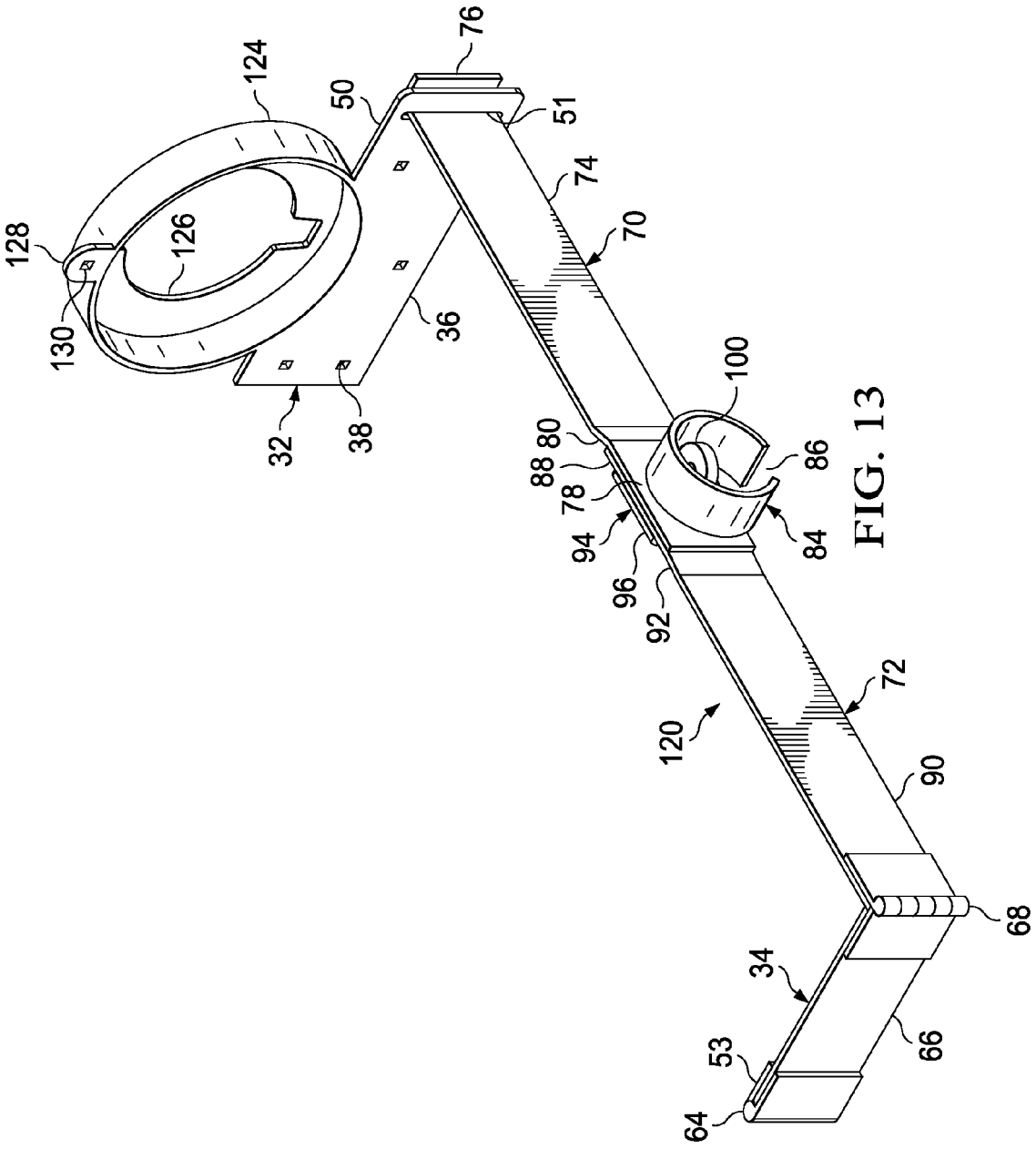
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FIG. 13

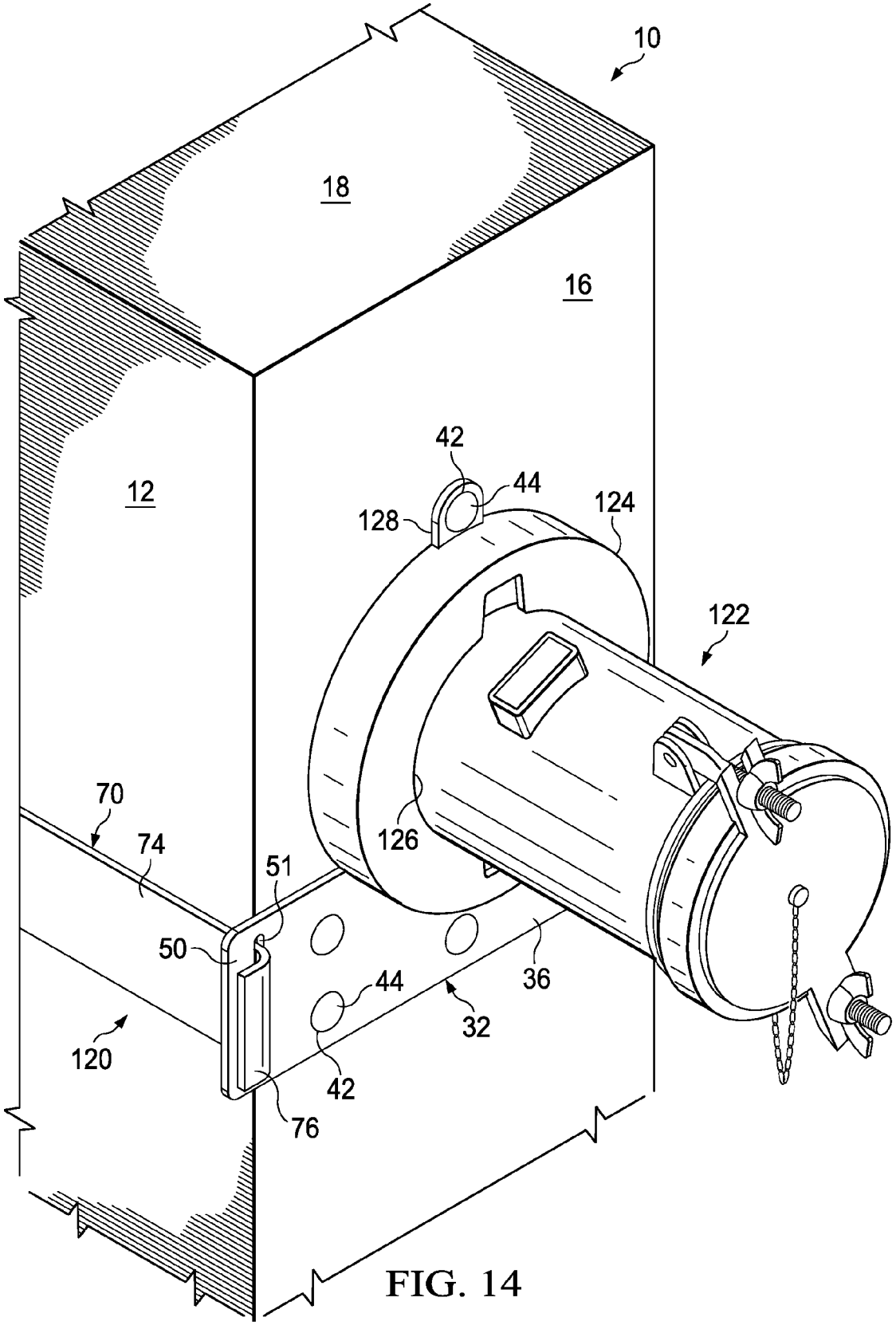
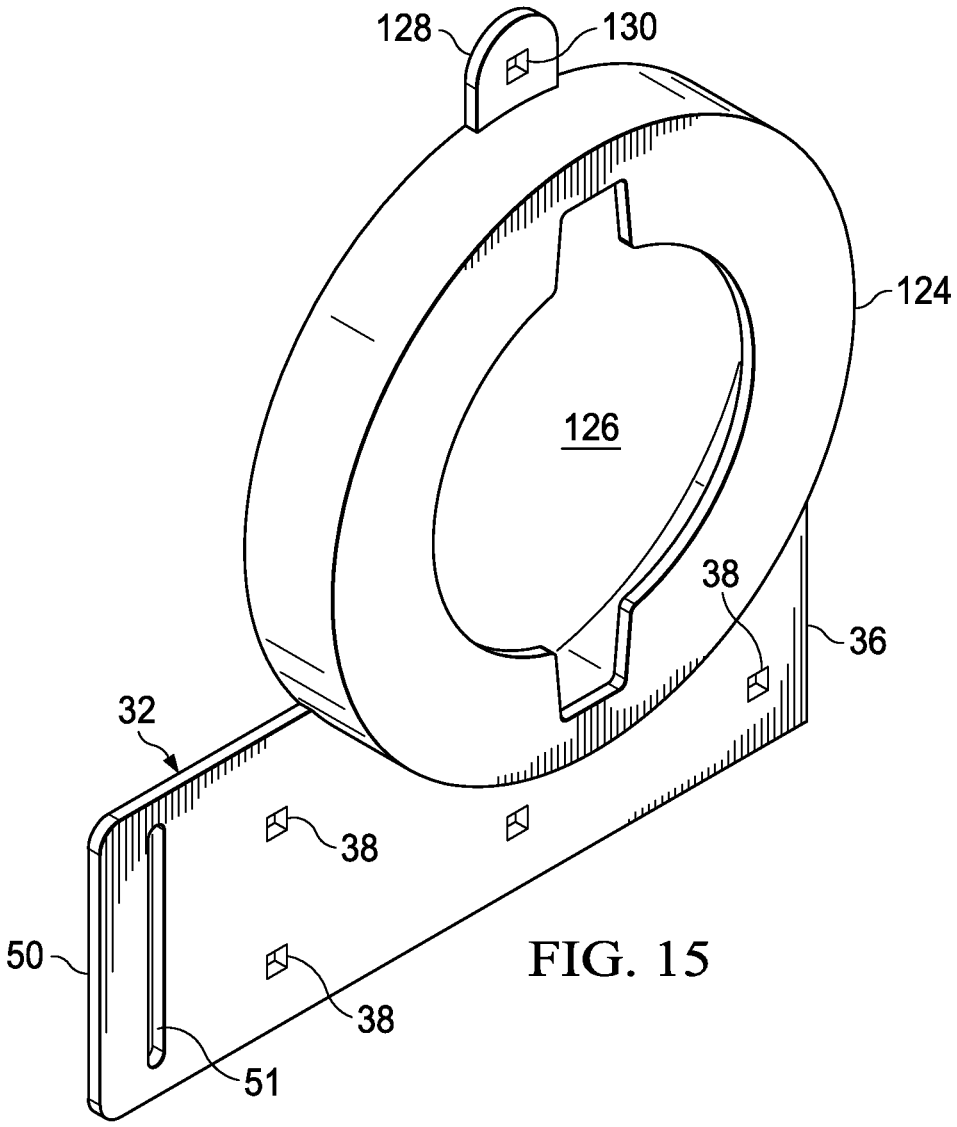



FIG. 14

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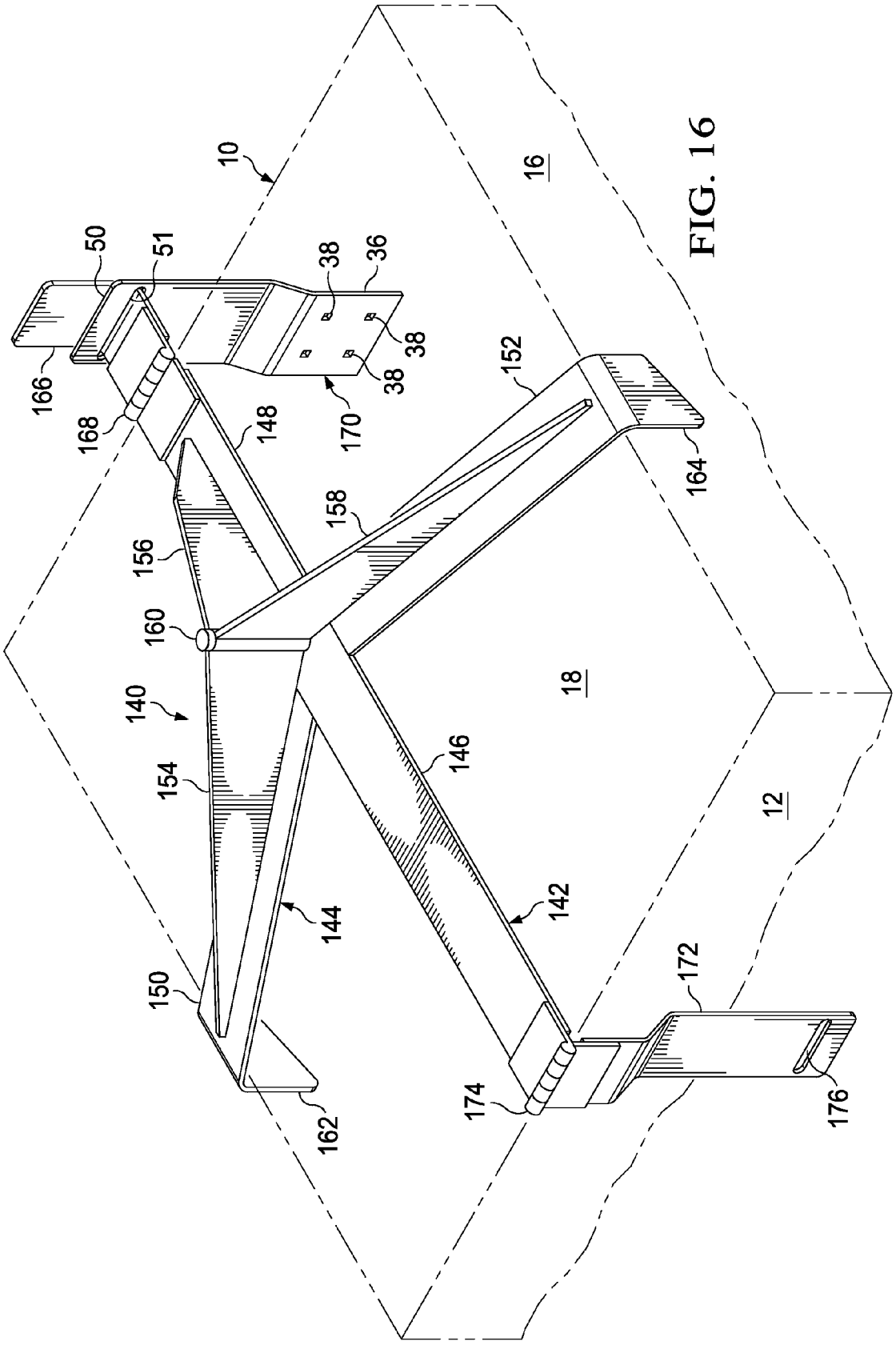
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FIG. 16

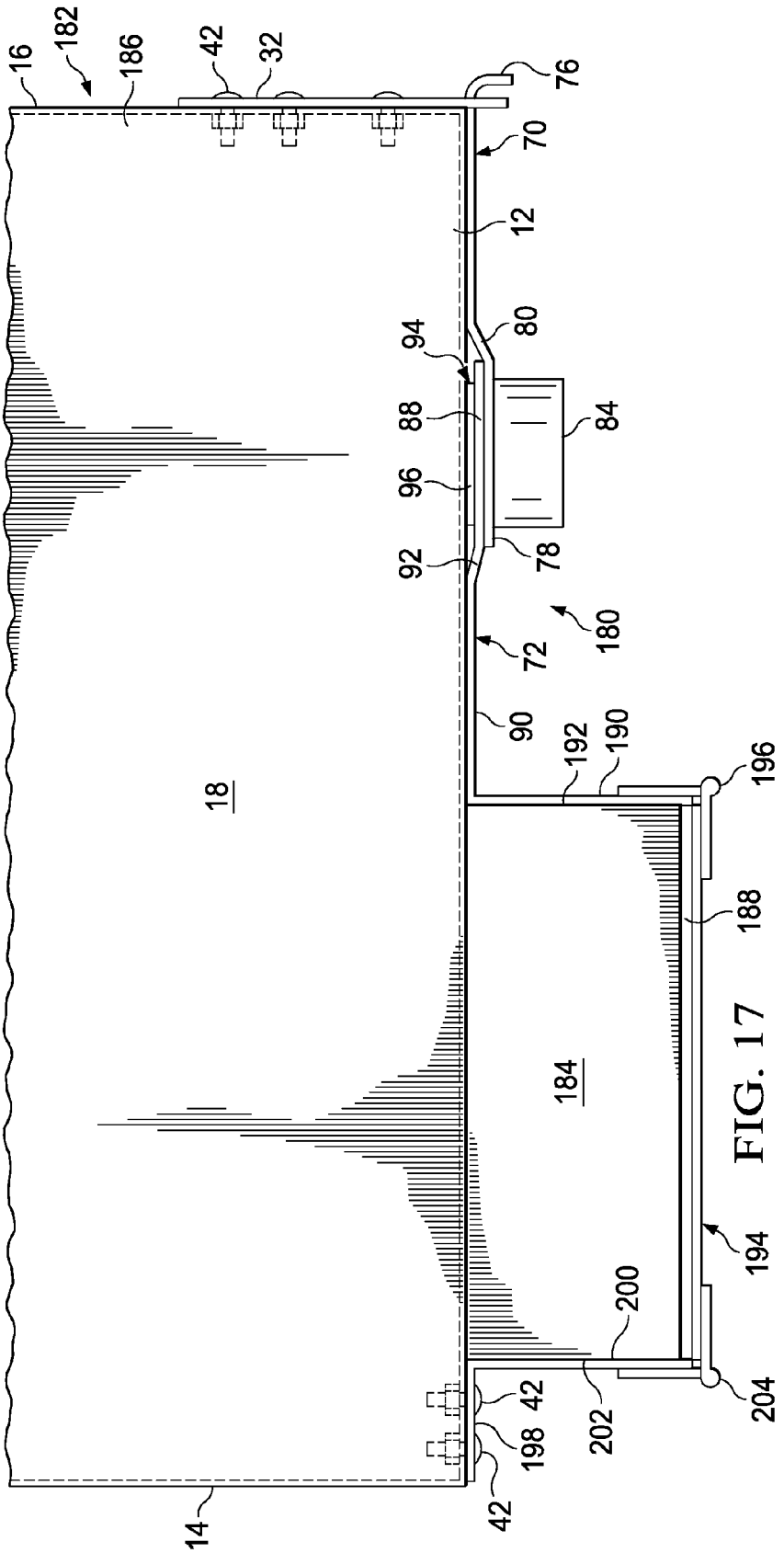
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FIG. 17

# ENCLOSURE LOCKING SYSTEM

## CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 61/604,001, filed Feb. 28, 2012, which is incorporated herein by reference in its entirety for all purposes.

## BACKGROUND

Enclosures used to house electrical equipment and instrumentation are generally configured as a box or cabinet. Such enclosures may be of the type used to house radio or telecommunications equipment and instrumentation, such as may be found or be associated without outdoor antennas, cell towers, transmission equipment, etc. Often such enclosures may house valuable materials or items, such as electrical components, copper wiring or batteries. Because such enclosures are often found outdoors in isolated areas, they can be vulnerable to tampering and theft of the contents contained within the enclosure. Oftentimes, the enclosure is provided with a non-substantial latch mechanism that is padlocked with a conventional padlock having an exposed shackle shank. The padlock and/or latch mechanism can often be quickly and easily removed with a common bolt cutter or hacksaw. Accordingly, the present invention serves to overcome these shortcomings.

## BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention, and the advantages thereof, reference is now made to the following descriptions taken in conjunction with the accompanying figures, in which:

FIG. **1** is a front perspective view of an enclosure that may be locked with the locking systems of the invention;

FIG. **2** is a front perspective view of an enclosure employing a locking system constructed in accordance with the invention;

FIG. **3** is a front perspective view of a locking system for use with an enclosure, such as that of FIG. **1**, and constructed in accordance with the invention;

FIG. **4** is a perspective view of a side mounting bracket of the locking system of FIG. **3**;

FIG. **5** is a cross-sectional view of the mounting bracket of FIG. **4**, shown mounted to a sidewall of the enclosure of FIG. **1**;

FIG. **6** is a perspective view of a doubled-hinged, side mounting bracket shown mounted to an opposite sidewall of the enclosure of FIG. **1**, and pivotally coupled to a outward end of a strap member of the locking system of FIG. **3**;

FIG. **7** is a perspective view of a sidewall abutting portion of the mounting bracket of FIG. **6**;

FIG. **8** is another strap member of the locking system of FIG. **3** that couples to the mounting bracket of FIG. **4**;

FIG. **9** is a front perspective view of an inner end of the strap member of FIG. **8**;

FIG. **10** is a front perspective view of an inner end of the strap member coupled to the mounting bracket of FIG. **6**;

FIG. **11** is a perspective view of a staple assembly of the locking system of FIG. **3**;

FIG. **12** is a perspective view of an alternate embodiment of the inner ends of strap members of the locking system that incorporates cooperating lock shroud portions and staple assembly;



FIG. **13** is a front perspective view of an alternate embodiment of a locking system that is provided with a power plug guard;

FIG. **14** is a front perspective view of the locking system of FIG. **13**, shown employed with a power protection enclosure with a projecting power plug;

FIG. **15** is a perspective view of a mounting bracket of the locking system of FIG. **13** showing the power plug guard;

FIG. **16** is a perspective view of a cover mount that may be used with the locking systems of FIGS. **3** and **13**; and

FIG. **17** is a top plan view of another embodiment of a locking system used in combination with an enclosure having a projecting sub-enclosure.

## DETAILED DESCRIPTION

Referring to FIG. **1**, an enclosure **10** of the type used to house electrical equipment and systems and components thereof is shown. The enclosure **10** is representative of other enclosures, such as those discussed in the background section, as will be readily understood by those skilled in the art. Such enclosure may be a weatherproof, outdoor enclosure (e.g., Hoffman box), such as used for housing telecommunications equipment, a cabinet for a backup battery for cellular site applications, or a power protection cabinet provided with a power generator plug. The enclosure **10** and components thereof may be formed various materials. These are typically metal materials, such as steel (e.g. 14 or 16 gauge), stainless steel, aluminum, etc., but could also be durable and strong non-metallic materials, such as fiberglass, polyester, polycarbonate, ABS, etc. In certain embodiments, the enclosure **10** may be configured or be provided with a Faraday cage or shield to block out external electrical fields.

The enclosure **10** may be configured as a rectangular box or cabinet having a forward face panel or wall **12** that extends between spaced apart opposite left and right sidewalls or panels **14**, **16** that are joined together by spaced apart upper and lower walls or panels **18**, **20** that each extend rearwardly from the forward panel **12** to a rear panel or back wall **22** to thus define an interior of the enclosure **10**. It should be noted that expressions of orientation, such as "left," "right," "forward," "rear," "upper," "lower," "outward," "inward," etc., with respect to the various components of the enclosure **10** and locking system described herein are merely used for convenience and are not necessarily to be used in a limiting sense. Such expressions, however, have been used in a consistent manner with respect to the figures and embodiments shown and should therefore facilitate a better understanding of the invention. The upper wall **18** forms a top of the enclosure and the lower wall **20** forms a bottom or floor. While the enclosure **10** is shown as having a rectangular box configuration and the various walls or panels of the enclosure are shown as being substantially flat planar members, other configurations may be used for the enclosure and the various walls or panels may have curved or non-planar configurations. It will be appreciated by those skilled in the art that the locking system, as is described herein, would be configured accordingly to cooperate with such enclosures.

The forward face panel **12** is movable relative to the rest of the enclosure and forms a door of the enclosure **10**. In the embodiment shown, the panel **12** is pivotally coupled to the enclosure by a hinge **26** locate along the left side edge to the forward panel **12**. This allows the panel **12** to be pivoted or moved about the hinge **26** between open and closed positions to selectively open or close a forward opening **24** of the enclosure **10** to thus allow or prevent access to the enclosure interior. In FIG. **1**, the door **12** is shown in a partially opened

position. The hinge **26** may be located at other positions as well, such as the right, top or bottom edge of the panel **12**. In other embodiments, the forward panel or door **12** may be movable in other manners relative to the rest of the enclosure **10**. For example, the front panel **12** may be secured over the opening **24** by the use of releasable fasteners (e.g. screws, clips, etc.) so that the entire front panel **12** is removed from the enclosure **10** to access the opening **24** and interior of the enclosure **10**.

Referring to FIG. **2**, an enclosure locking system **30** is shown employed with the enclosure **10**. The locking system **30** can be more clearly seen in FIG. **3**. The locking system **30** includes a left side mounting bracket **32** and a right side mounting bracket **34** that are mounted to the exterior of the left and right sidewalls **14**, **16** of the enclosure. As will be appreciated, the mounting brackets **32**, **34** could also be used on any spaced apart opposite walls, such as the upper and lower walls **18**, **20**, located on opposite sides of a door or wall that is to be secured by the locking system **30**.

Referring to FIG. **4**, the mounting bracket **32** is formed as an elongated plate having a rearward portion **36** that abuts against the exterior surface of the sidewall **14**. One or more apertures or bolt holes **38** are provided in the rearward portion **36** to facilitate securing the bracket to the sidewall **14**. The bolt holes **38** are rectangular, square or otherwise configured to receive and engage the shoulder portion **40**, which is shown as being squared, of a carriage bolt **42** (FIG. **5**) to prevent rotation of the shoulder portion **40** within the bolt hole **38**. The carriage bolt **42** has a rounded or domed head **44** that is configured so that it is non-engagable or cannot be engaged or rotatably driven with a tool, such as a screwdriver or wrench, from the exterior of the enclosure **10**. The threaded shank **46** of the bolt **42** engages a threaded nut **48** that is only accessible from the interior of the enclosure **10** and is positioned on the interior side of the sidewall **14** to tighten and secure the bracket **32** in place.

Other releasable fasteners that are inaccessible and/or non-engagable with a cooperating tool from the exterior of the enclosure may also be used to secure the mounting bracket **32** to the sidewall **14**. In other embodiments, the mounting bracket **32** may be non-releasably coupled to the sidewall **32**, such as through welding, or otherwise incorporating the mounting bracket **32** into or to the structure of the sidewall **14** so that it is non-removable from the exterior of the enclosure **10**.

The forward portion **50** (FIG. **4**) of the bracket **32** is shown flared or stepped outward from the rearward portion **36** and sidewall **14**. An intermediate, transitional flared portion or step **52** joins the rearward and forward portions **36**, **50** together. This facilitates accommodation of framework or other projecting structures that may be located at the front of the enclosure **10**, such as the hinge **26**. In other embodiments the bracket **32** may be a flat planar member, with the rearward portion **36** and forward portion **50** both lying in the same plane.

The forward portion **50** of the bracket **32** projects forward beyond the forward end of sidewall **14** a distance. On this forward projecting portion near the forward end of the forward portion **50** of the mounting bracket **32**, an elongated, vertical strap member slot **51** is provided for receiving a strap member, as is described later on.

In certain embodiments, as shown in FIG. **4**, additional reinforcement areas, such as the areas **55**, may be provided on the forward portion **50** of bracket **32** surrounding the slot **51**. The areas **55** are shown as strips of material that are welded or otherwise secured to the forward edges and corners of the forward portion **50** surrounding the slot **51**. The areas **55** may be formed from a different material (e.g., hardened tool steel, etc.), than the material of the bracket **32** that is more difficult to cut or otherwise damage so that slot **51** cannot be opened, such as by cutting, or damaged. The reinforcement areas **55** may be welded or otherwise non-removably secured to the bracket **32**. Such reinforcement areas, such as the areas **55**, may be provided on other members or areas described herein in areas of the various members of the locking system that may be prone to tampering, as well.

The right mounting bracket **34** is shown more fully in FIG. **6**. The mounting bracket **34** has a rear abutting portion **53** that is mounted to and abuts against the exterior surface of the right sidewall **16**. FIG. **7** shows a more detailed view of the abutting portion **53**. The abutting portion **53** is generally formed as a substantially flat plate or planar member having one or more bolt holes or apertures **54** for receiving a screw, bolt or other fastener **56** (FIG. **6**). In the embodiment shown in FIG. **7**, the bolt holes **54** are configured as countersink holes for receiving a cooperating countersink head **58** of the bolt **56** to facilitate a flush configuration for the exterior of the abutting portion **53**. The head **58** may be configured with a slot or engaging structure to engage a screwdriver or other tool (not shown). As will become apparent, the bolt heads **58** become inaccessible when the enclosure locking system **30** is in a locked condition. The threaded shank **60** of the bolt **56** extends into the enclosure interior and engages a nut **62** that is only accessible from the interior of the enclosure **10** and is positioned on the interior side of the sidewall **16** to tighten and secure the bracket **34** in place.

The rearward end of the abutting portion **53** of the mounting bracket **34** is formed as or is otherwise coupled to a rearward hinge **64** that is coupled or cooperates with the rearward end of a hinge portion **66** of the mounting bracket **34**. The hinge portion **66** is also formed as a substantially flat plate or planar member having a forward end that projects forward beyond the forward end of the right sidewall **16** when the hinge portion **66** is pivoted against the abutting portion **53**, so that it generally abuts or is in close proximity to the abutting portion **53**. When in this position, which also corresponds to the locked condition of the locking system **10**, the bolt heads **58** of the bolts **56** are covered by the hinge portion **66** and are inaccessible so that the mounting bracket **34** cannot be unfastened and removed from the exterior of the enclosure **10**.

Other releasable coupling mechanisms that are inaccessible and/or non-engagable with a cooperating tool from the exterior of the enclosure **10** may also be used to secure the mounting bracket **34** to the sidewall **16**. In other embodiments, the abutting portion **53** of the mounting bracket **34** may be non-releasably coupled to the sidewall **16**, such as through welding, or the mounting bracket **34** may be otherwise non-releasably incorporated into or coupled to the structure of the sidewall **16**.

The forward end of the hinge portion **66** of the bracket **34** is also configured as or is coupled to a forward hinge **68**. The hinges **64**, **68** should be configured so that uncoupling or disassembly of the hinges **64**, **66** is prevented when the locking system **10** is in the locked condition.

It should be noted that, while the mounting brackets **32**, **34** are shown in particular configurations and being mounted to the sidewalls **14**, **16**, they may have other configurations and be mounted to the enclosure **10** in other manners as well. For example, the mounting brackets **32**, **34** may be formed as non-planar members or members with non-planar portions. Additionally, the side mounting brackets **32**, **34** may be formed as or from one or more contiguous or non-contiguous, integral or non-integral components that extend around the

rear of the enclosure **10** (i.e., around the back wall **22**) or over the top or bottom of the enclosure **10** (i.e., around the upper or lower walls **18**, **20**).

Referring to FIG. **3**, the locking system **30** further includes left and right strap members **70**, **72**, respectively. FIG. **8** shows a more detailed view of the left strap member **70**. The strap member **70** is generally formed as an elongated plate or planar member that has an outer end or portion **74** that hooks or is bent or angled forward (L-shape) at the outermost point to form angled portion **76**. The outer end **74** and angled portion **76** are configured and sized to be received within and pass through the vertical slot **51** of the left bracket **32** by angling or crooking the angled portion **76** through the slot **51** and then rotating the strap member **70** into a locked position. With the angled portion **76** being crooked and passed through the slot **51**, the strap member **70** may then be moved longitudinally to various positions along its length within the slot **51**. The angled portion **76** is configured and sized so that it cannot pass through the slot **51** when the length of the strap member **70** is moved longitudinally along its length within the slot **51**.

An opposite inner end or portion **78** of the strap member **70** is shown flared or stepped forward from the outer portion **74**. An intermediate, transitional flared or stepped portion **80** joins the opposite outer and inner end portions **74**, **78** together.

Referring to FIG. **9**, the inner portion **78** of the strap member **70** is provided with an elongated slot **82** that is formed through the thickness of the inner portion **78**. A lock shroud or guard **84** is also provided on the forward face of the inner portion **78** and extends forward a distance. The lock shroud **84** is shown as being generally circular in shape and is provided with a lower open portion **86**. The lock shroud **84** is non-releasably coupled to the inner portion **78**, such as through welding or other non-releasable coupling mechanisms. The lock shroud **84** is configured to surround a padlock used for locking the locking system **30** to facilitate prevention of tampering with such padlock or accessing a shackle or lock pin of the padlock. In the embodiment shown, the circular shape of the shroud **84** facilitates receiving and surrounding a disk or puck lock, as is described further on. The shroud **84** may be similarly configured and constructed to that shown and described in U.S. Pat. No. 5,172,574, which is herein incorporated by reference in its entirety for all purposes.

Referring to FIG. **10**, the right strap member **72** is generally formed as an elongated plate or planar member that has an planar inner portion or end **88** that is also provided with an elongated slot **89** that is formed through the thickness of the inner portion **88**. The inner end or portion **88** of the strap member **72** is shown flared or stepped forward from the planar outer portion or end **90**. An intermediate, transitional flared or stepped portion **92** joins the opposite inner and outer end portions **88**, **90** together.

The outermost end of the end portion **90** is configured as part of or is coupled to the forward hinge **68** of mounting bracket **34** so that the strap member **72** is coupled to the mounting bracket **34** through the hinge **68** to allow the strap member **72** to be pivotally moved relative to the hinge portion **66**.

A staple assembly **94** of the locking system **30** is shown in FIG. **11**. The staple assembly **94** includes a base or plate member **96** having one or more apertures or bolt holes **98** for receiving, screws, bolts or other fasteners. In the embodiment shown, the holes **98** are countersink holes for receiving a cooperating countersink head of a bolt or screw (not shown) to facilitate a flush forward exterior of the base **96**.

Projecting forward from the base **96** is a staple member **100** having a shackle opening **102** for receiving a shackle or lock pin of a padlock or other locking device.

In the embodiment shown, the staple assembly **94** is mounted on the forward face of the door panel **12**. Holes or apertures (not shown) may be formed in the door panel **12** to facilitate mounting and coupling of the staple assembly **94** to the door **12**. Cooperating nuts or other fastening mechanisms (not shown), which may be located on the rear or interior side of the door **12**, may be used to facilitate mounting of the staple assembly **94**.

In other embodiments, the base **96** may be located and mounted on the interior or rearward side of the door panel **12**. A slot or aperture (not shown) may be provided in the door **12** to receive the projecting staple member **100** so that the staple member **100** projects forward from the door **12**. In still other embodiments, the staple assembly **94** may be non-releasably coupled to the door **12**, such as through welding or the staple assembly **94** may be otherwise incorporated into or to the structure of the door panel **12**.

The projecting staple member **100** is positioned on the face of the door panel **12** and configured to be received within and project through the slots **82**, **89** of the strap members **70**, **72**, respectively, when they are in a locked configuration.

The mounting brackets, strap members, staple assembly, etc. and components thereof of the system **30** and other systems described herein may each formed from substantial metal, metal alloy or steel plate materials that are not readily cut with a conventional bolt cutters or hacksaw. Hardened steel materials, such as hardened carbon steel may be used. Steel alloys containing chromium, nickel, molybdenum, tungsten, boron, manganese, and combinations of these materials may be used. In particular applications, stainless steel having a thickness of ⅛ inch or greater (e.g. 3⁄16 to ¼ inch) is used. A minimum width or transverse dimension of 1½ or 2 inches to 5 inches or more may be provided for the mounting brackets, strap members, etc., so that they cannot be readily cut or damaged. Welds used to non-releasably or non-removably join the various components together may be formed by metal inert gas (MIG) or tungsten inert gas (TIG) welds or other suitable welding techniques used to weld such high strength or hardened materials together. In certain embodiments, all or a portion of the components of the locking system **30** may be reinforced. For example, the areas at the ends or around the perimeter of the slots **51**, **82**, **89** may be reinforced with hardened tool steel or other hardened materials that are highly resistant to cutting. These materials may be welded or otherwise coupled to the components or the components themselves may be formed from these materials.

It should be noted in the description, if a numerical value or range is presented, each numerical value should be read once as modified by the term "about" (unless already expressly so modified), and then read again as not so modified unless otherwise indicated in context. Also, in the description, it should be understood that an amount range listed or described as being useful, suitable, or the like, is intended that any and every value within the range, including the end points, is to be considered as having been stated. For example, "a range of from 1 to 10" is to be read as indicating each and every possible number along the continuum between about 1 and about 10. Thus, even if specific points within the range, or even no point within the range, are explicitly identified or refer to, it is to be understood that the inventor appreciates and understands that any and all points within the range are to be considered to have been specified, and that inventor possesses the entire range and all points within the range.

In use, the enclosure **10** is provided with the locking system **30**. This may be provided as an add-on that is provided with a preexisting enclosure or the enclosure **10** may be provided with the locking system **30** already provided and incorporated with the enclosure **10**. The mounting brackets **32**, **34**, right strap member **72** and staple assembly **94** are coupled, mounted or otherwise secured to the enclosure **10** as previously described. The left strap member **70** may be initially removed from the locking system **30** when in an unlocked condition.

With the left strap member **70** removed, the door **12** of the enclosure **10** may be opened by pivoting the right strap member **72** out of the way. This is accomplished by the double hinges **64**, **68** that allow both the hinge portion **66** of the mounting bracket **34** and the strap member **72** to be pivoted to an open position outward and fully away from the side of the door **12** and enclosure **10**. The door **12** may then be opened to allow access to the interior of the enclosure **10**.

When the door **12** is closed, the locking system **30** can be locked to a locked condition to prevent unauthorized access to the interior of the enclosure. To lock the locking system **30**, the right strap member **72** is rotated or pivoted about the hinges **64**, **68**, to a closed position wherein the strap member **72** extends across and overlies the closed door panel **12**, with the staple member **100** being received and projecting through the slot **89**. The flared or stepped inner end **88** of the strap member **72** facilitates accommodating the thickness of the base **96** of the staple assembly **94** so that it generally abuts against the forward face of the base **96**.

When the right strap member **72** is in this closed position, the hinge portion **66** of the right mounting bracket **34** will overlie and abut against the sidewall abutting portion **53** so that the fasteners **58** are effectively covered by the portion **66** and are thus inaccessible and cannot be tampered with or removed.

The left strap member **70** is then secured by initially angling or crooking the angled portion **76** and inserting it through the slot **51** of the left mounting bracket **32**. Once the angled portion **76** is passed through the slot **51**, the strap member **70** can then be rotated towards the front of the panel **12** so that it extends over and overlies the panel **12**. The slot **51** allows the strap member **70** to be moved longitudinally along its length inward or outward to a closed position wherein the inner end **78** is positioned and aligned so that it overlaps the inner end **88** of the right strap member a distance and so that the slot **82** is aligned and receives the projecting staple member **100** of the staple assembly **94**. With the staple member **100** received within the slot **82**, the inner end **78** of the left strap member **70** extends across and overlies the door panel **12**. The forwardly flared or stepped inner end **78** of the left strap member **70** facilitates accommodating the thicknesses of both the inner end **88** of the right strap member **72** and the base **96** of the staple assembly **94**. The hooked or angled outer end **76** prevents removal of the left strap member **70** from the mounting bracket **32** when the strap member **70** generally lies or abuts against the door panel **12** and the staple member **100** is received within the slot **82** of the inner end **78**.

With the locking system **30** in the above described locking configuration, a padlock or other locking device, such as the padlock **104** of FIG. **2**, may then be used to lock the locking system **30**, with the shackle or locking pin (not shown) of such padlock being received within the shackle opening **102** of the staple member **100**. With the padlock locked on the staple member **100**, this effectively couples and locks the strap members **70**, **72** together on the staple member **100** and locks the locking system **30** in a locked condition. In particular embodiments, the padlock **104** may be a disk or puck lock, which are conventional in design. Examples of such disk or puck padlocks are describe in U.S. Pat. Nos. 3,769,821; 5,172,574; and 6,766,671, each of which is incorporated herein by reference for all purposes. The shroud **84** effectively covers the body of the lock **104** to prevent tampering or access to the lock **104** and shackle or locking pin of such lock. The opening or gap **86** of the lock shroud **84** facilitates access to a portion of the lock **104** to facilitate insertion of a key or otherwise provides appropriate access to unlock the padlock **104**.

In other embodiments, the left strap member **70** may be configured without the lock shroud **84** and be positioned over the door panel **12** and over the staple member **100** first, followed by the right strap member **72**. In such cases, the lock shroud **84** is provided on the forward face of the inner end of the right strap member **72**.

With the padlock **104** removed, the locking system **30** can be removed by reversing the process used to configure the locking system to its locked configuration, as previously described. This involves lifting the left strap member **70** from the staple member **100** and sliding the strap member **70** through the slot **51** of mounting bracket **32** so that it can then be removed from the slot **51** and mounting bracket **32** and placed out of the way. The right strap member **72** can then be lifted from the staple member **100** and rotated out of the way of the door **12**, about hinges **66**, **68**, so that the door **12** can be opened to access the interior of the enclosure **10**.

As will be apparent to those skilled in the art, although the locking system **30** was described for a particular embodiment, variations of the locking system may also be provided or the locking system **30** may be used in a different manner. For example, the positions of the left and right mounting brackets and strap members may be reversed or they may be used at upper and lower positions so that the strap members extend vertically instead of horizontally across the panel door **12**. Additionally, a single mounting bracket may be employed with locking straps, or a series of locking straps that are coupled together by hinges or the like, being coupled to the single mounting bracket so that they extend around the entire perimeter of the enclosure.

Additionally, the locking system **30** may be used with enclosures of different configurations, such as with a door hinged on the left side or a non-hinged door that is merely removed from the front of the enclosure, etc. More than one locking system **30**, or other locking system described herein, may be used with a particular enclosure for locking portions thereof.

Referring to FIG. **12**, another configuration of the inner ends **78**, **88** of the strap members **70**, **72**, respectively, is shown that eliminates the need for a separate staple assembly that is mounted to the panel door **12**. In the embodiment shown, a staple assembly **106** is shown formed from two staple members **108**, **110** provided on the inner ends **78**, **88**, respectively, which are configured in longitudinally overlapping stepped configurations—one above the other, of the strap members **70**, **72**. The staple members **108**, **110** have shackle apertures or openings that align with one another when the strap members **78**, **88** are in the closed or locked configuration.

Additionally, the locking shroud **84** is formed from separate locking shroud portions **114**, **116** on the inner ends **78**, **88**, respectively, that cooperate when in the locked position to form the locking shroud **84**.

Referring to FIG. **13**, a locking system **120** is shown that is similar to the locking system **30**, with similar components designated with the same reference numerals. The locking system **120** differs in one aspect from the locking system **30**

in that the positions of the mounting brackets **32**, **34** and strap members **70**, **72** are reversed (i.e. left/right). The locking system **120** also differs in that it is one that may be used with a power protection enclosure or cabinet that has a power generator plug **122** that projects from the side of the enclosure, as shown in FIG. **14**.

As can be seen more fully in FIG. **15**, the rearward portion **36** of the mounting bracket **32** has incorporated with it a power plug guard or shroud **124** having a central opening **126** that receives and accommodates the projecting power plug **122** that projects from the enclosure **10**. A mounting flange or tab **128** is also provided with the shroud **124** and has an aperture **130** that may be configured like the holes **38** of the bracket **32** for use with carrier bolts **42**, as previously described.

The bracket **32** also differs from that of system **30** in that the forward portion **50** is not stepped or flared, but is coplanar with the rearward portion **36**.

Referring to FIG. **16**, a cover mount assembly **140** is shown that may be used in conjunction with the locking systems **30** and **120** or may be used by itself. The cover mount **140** is used to secure the top or upper wall **18** of an enclosure, which may be removable in some embodiments of enclosures. In particular, the cover mount **140** may be used in backup battery cabinets or enclosures.

The cover mount assembly **140** includes rigid cross members **142**, **144**, which are oriented generally transverse to one another. The cross members **142**, **144** may be in the form of substantially flat metal plates that are configured to generally overlie the upper wall **18** of an enclosure **10**. The cross member **142** is sized and configured to extend over the top or upper wall **18** of the enclosure from the front to the back of the enclosure on which it is used. The cross member **142** has a front leg **146** extending forward from the cross member **144** and a rear leg **148** extending rearward from the cross member **144**. Similarly, the cross member **144** is sized and configured to extend transversely across the upper wall **18** from the left to right sidewalls **14**, **16**. The cross member **144** has left and right legs **150**, **152** that extend from the cross member **142**.

The cross members **142**, **144** may be non-releasably coupled together, such as through welding, etc. Reinforcing webs, ribs or gussets, such as the upright webs **154**, **156**, **158**, may be provided along all or a portion of the length of the upper surface of the legs **146**, **148**, **150**, **152**. In the embodiment shown, the webs **154**, **156**, **158** have a generally triangular configuration that converge and are joined together at apex **160**, where the cross members **140**, **142** cross. The webs **154**, **156**, **158** reinforce the cross members **140**, **142** so that they cannot be pried loose or otherwise be bent or damaged.

As shown in FIG. **16**, the outer ends of the legs **150**, **152** have downward projecting arms or portions **162**, **164** that are configured to project a distance along and overlie the left and right sidewalls **14**, **16** of the enclosure on which they are used.

An angled member **166** having a generally L-shaped profile or configuration is coupled to the rear end of the rear leg **148** by a hinge **168** so that it can be pivoted downward from the position shown in FIG. **16**. The free end of the angled member **166** is sized and configured to be received within a slot **51** of a rear cover mounting bracket **170** that may be configured similarly to the mounting bracket **32**, previously described, with similar components labeled with the same reference numerals. The mounting bracket **170** is mounted to the rear wall **22** such as with carrier bolts **42**, as previously described, and functions similarly to the mounting bracket **32**. The bracket **170** is positioned on the rearward wall **22** so that end of the bracket **170** projects a distance with the slot **51** being located at a position slightly above the upper wall **18**.

The hinged angled member **166** allows the rear leg **148** to be more easily coupled to the mounting bracket **170**. Because space behind the enclosures may be limited or the enclosures may be at an elevated height, the hinged angled portion **166** can be pivoted into place and engaged with the mounting bracket **170** without having to angle or orient the entire cover system **140** so that the rear leg **148** engages the mounting bracket **170**. In other embodiments, the outer end of the rear leg **148** may be configured similarly to the outer end **90** of the strap member **72**, with the angled portion **76** being rigid, as has been previously described.

A cover strap member **172** is coupled to the forward end of the front leg **146** by a hinge **174**. The strap member **172** may be configured similarly to the strap member **72**, previously described. The strap member **172** is pivotal downward and upward so that it can be moved out of the way of the front panel **12** of the enclosure **10**. The free end of the strap member **172** is provided with a slot **176**. When the cover mount **140** is positioned over the top of the enclosure, the free end of the strap member **172** is sized and configured to overlie the staple assembly **94** so that the staple member **100** is received within the slot **176**.

In use, the cover mount **140** is positioned over the top of the enclosure **10** with the free end of the angled member **166** being inserted into the slot **51** of mounting bracket **170**. The free end of the strap member **172** is lowered so that it extends across the upper portion of the front panel **12** and the staple member **94** is received within the slot **176**, which is the position the cover mount **140** is in during a locked condition.

When used with either of the locking systems **30**, **120**, the strap member **72** is pivoted and positioned on the staple member **100**, followed by positioning of the other strap member **70**, in the manner previously described. A padlock can then be positioned on the staple member **100** and locked so that the mounting cover and locking systems **30**, **120** are in a locked condition.

Referring to FIG. **17**, another embodiment of a locking system **180** is shown for use with an enclosure **182**. The enclosure **182** is similar to the enclosure **10** with similar components being labeled with the same reference numerals. The enclosure **182** has a projecting sub-enclosure structure **184** that projects forward from a portion of the front face panel **12** of a larger main enclosure **186**. The sub-enclosure structure **184** is generally spaced apart from the sides of the face panel **12**, as is shown. The face panel **12** of the main enclosure **186** may be a non-movable face panel or a movable face panel. The sub-enclosure structure **184** may include a movable front face panel **188** that forms a door of an opening of the structure **184** to access the interior of the structure **184**. In some embodiments, the entire sub-enclosure structure **184** may be movable with respect to the main enclosure **186**, with the sub-enclosure **184** itself forming a door or cover for an opening formed in the face panel **12** of the main enclosure **186**. In such cases, the face panel **188** of the enclosure **184** may be movable or non-movable.

As shown, a strap member **72** having an outer end portion **90** is bent or angled so that it has an angled portion **190** that projects forward along the right sidewall **192** of the sub-enclosure **184**. The strap member **72** with the angled portion **190** is sized and configured to accommodate the right sidewall **192** of the sub-enclosure **184** so that the angled portion **190** generally lies against and extends along the length of the sidewall **192**.

The forward end of the angled portion **192** is coupled to an inner end of a sub-enclosure strap **194** through hinge **196**. The sub-enclosure strap **194** is formed as an elongated plate or planar member, which may be similar to the straps **70**, **72**,

previously described for enclosure **10**. The strap **194** is sized and configured to extend across the width of front face panel **188** of the enclosure **184**.

A mounting bracket **198** that may be configured similarly to bracket member **32** of enclosure **10** is provided on the left side of the face panel **12** and is coupled thereto with carrier bolts **42**, as has been described. The bracket **198** is formed as an angled plate member having a forward projecting portion **200** that is sized and configured to accommodate the left sidewall **202** of the sub-enclosure **184** so that the portion **200** generally lies against and extends along the length of the sidewall **202**. The bracket **198** may be positioned at other positions as well, such as the left sidewall **14** of the main enclosure **186**. In such instances where the bracket **198** is differently positioned to the embodiment shown, cooperating structures, members, hinges, etc., may be provided to accommodate the size and shape of the main enclosure **186** and sub-enclosure **184**.

A hinge **204** couples the forward portion **200** of bracket **198** to the outer end of the sub-enclosure strap **194**, so that the straps **72**, **194** are pivotal about the hinges **196**, **204**. Together the straps **72**, **194** that are coupled together through the hinges **196**, **204** constitute a single locking strap member as that term is used in detailed description and in the claims. Thus, in certain embodiments two or more straps or other members that are coupled together through hinges or other coupling structures may constitute a single locking strap member.

As shown, a mounting bracket **32** is provided on the left sidewall **16** of main enclosure **186** by means of carrier bolts **42**, as has been previously described. The crooked or angled portion **76** of strap member **70** is received within and passes through the vertical slot **51** of the bracket **32**.

A staple assembly **94** is provided on the face panel **12** of the main enclosure **186**, as with the enclosure **10** previously described.

In use, the enclosure **182** with the sub-enclosure **184** is provided with the locking system **180**. With the strap member **70** removed, the face panel **188** of the sub-enclosure **184** may be opened by pivoting the strap member **72** with angled portion **190** and the strap member **194** out of the way. This is accomplished by means of the hinges **196**, **204**. The door or face panel **188** may then be opened to allow access to the interior of the sub-enclosure **184**. In other embodiments, this may also allow removal or opening of the entire sub-enclosure **184** from the face panel **12** of the main enclosure **186**.

When the panel **188** is closed, the locking system **180** can be locked to a locked condition to prevent unauthorized access to the interior of the enclosure **182**. To lock the locking system **180**, the strap member **72** with angled portion **190** and the strap member **194** are rotated or pivoted about the hinges **196**, **204**, to a closed position wherein the strap member **194** extends across and overlies the width of the closed door panel **188** of the sub-enclosure **184** and the inner portion **88** of the strap member **72** receiving the staple member (not shown) of the staple assembly **94**. The strap member **70** can then be secured as has been described previously and a padlock or other locking device can then used to lock the locking system **180** in a locked condition.

While the invention has been shown in only some of its forms, it should be apparent to those skilled in the art that it is not so limited, but is susceptible to various changes and modifications without departing from the scope of the invention. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the scope of the invention.

We claim:

**1**. An enclosure and locking system comprising:

an enclosure having an opening that allows access to the interior of the enclosure, the enclosure having a projecting power plug;

an enclosure door or access panel that is movable between an open and closed position to selectively open and close the opening of the enclosure;

first and second side mounting brackets that are each coupled to opposite portions of the enclosure located on opposite sides of the opening, the first and second mounting brackets being either 1) non-releasably coupled to the opposite portions of the enclosure or 2) releasably coupled to the opposite portions of the enclosure with releasable fasteners that are at least one of inaccessible and non-engagable with a cooperating tool when the enclosure locking system is in a locked condition;

first and second locking strap members having opposite outer and inner ends, the first and second locking strap members each being coupled at the outer end to one of the first and second side mounting brackets when in a locked condition, the inner end of each locking strap member extending from the outer end when in the locked condition to a position wherein the inner end of each strap member overlaps the other a distance when in the locked condition, at least a portion of at least one of the first and second locking strap members overlying the door or access panel when the door or access panel is in the closed position when in the locked condition;

a staple assembly that is one of A or B, wherein:

A is the staple assembly is either 1) non-releasably coupled to the door or access panel or 2) releasably coupled to the door or access panel with releasable fasteners that are at least one of inaccessible and non-engagable with a cooperating tool when the enclosure locking system is in a locked condition, the staple assembly having a projecting staple member that projects forward from the door or access panel, the staple member having a shackle opening for receiving a shackle or lock pin of a padlock, and wherein the strap members are provided with apertures for receiving the staple member when in the locked condition; and

B is the staple assembly is formed from cooperating staple members that are provided on the inner ends of the first and second strap members, the staple members each having a staple opening that is aligned with the other for receiving a shackle or lock pin of a padlock when in the locked condition; and wherein

at least one of the first and second side mounting brackets includes a power plug guard or shroud having a central opening for receiving and accommodating the projecting power plug of the enclosure.

**2**. The enclosure and locking system of claim **1**, further comprising:

a lock shroud that is non-releasably coupled to at least one of the inner ends of the first and second strap members, the lock shroud being configured to surround a padlock, or shackle or locking pin of a padlock when secured to the staple assembly to facilitate prevention of tampering with such padlock.

**3**. The enclosure and locking system of claim **1**, wherein:

the opposite portions of the enclosure are opposite sidewalls of the enclosure.

4. The enclosure and locking system of claim 1, wherein:
the inner end of each strap member overlies the door or access panel when the door or access panel is in the closed position.

5. The enclosure and locking system of claim 1, further comprising:
a cover mount assembly comprising:
at least one cross member having opposite first and second ends that is configured for extending across an upper wall of the enclosure;
at least one cover mounting bracket that is coupled to a portion of the enclosure located on one side of the upper wall, the first end of the at least one cross member coupling to the at least one cover mounting bracket; and
a cover mount strap member coupled to the second end of the at least one cross member, the cover mount strap member being provided with an aperture for receiving the staple member or cooperating staple members when in the locked condition.

6. The enclosure and locking system of claim 5, wherein:
the cover mount assembly further comprises a second cross member that is oriented transverse to the at least one cross member for extending transversally across the upper wall of the enclosure.

7. The enclosure and locking system of claim 1, wherein:
at least one of the first and second locking strap members is formed from two members that are pivotally coupled together.

8. The enclosure and locking system of claim 1, wherein:
the staple assembly is A.

9. The enclosure and locking system of claim 1, wherein:
the enclosure comprises a main enclosure and a projecting sub-enclosure that projects from a portion of the main enclosure; and wherein
at least one of the first and second locking strap members is formed from two members that are pivotally coupled together, at least one of the two members of said at least one of the first and second locking strap members overlying the sub-enclosure.

10. An enclosure and locking system comprising:
an enclosure having an opening that allows access to the interior of the enclosure;
an enclosure door or access panel that is movable between an open and closed position to selectively open and close the opening of the enclosure;
first and second side mounting brackets that are each coupled to opposite portions of the enclosure located on opposite sides of the opening, the first and second mounting brackets being either 1) non-releasably coupled to the opposite portions of the enclosure or 2) releasably coupled to the opposite portions of the enclosure with releasable fasteners that are at least one of inaccessible and non-engagable with a cooperating tool when the enclosure locking system is in a locked condition;
first and second locking strap members having opposite outer and inner ends, the first and second locking strap members each being coupled at the outer end to one of the first and second side mounting brackets when in a locked condition, the inner end of each locking strap member extending from the outer end when in the locked condition to a position wherein the inner end of each strap member overlaps the other a distance when in the locked condition, at least a portion of at least one of the first and second locking strap members overlying the door or access panel when the door or access panel is in the closed position when in the locked condition;
a staple assembly that is one of A or B, wherein:
A is the staple assembly is either 1) non-releasably coupled to the door or access panel or 2) releasably coupled to the door or access panel with releasable fasteners that are at least one of inaccessible and non-engagable with a cooperating tool when the enclosure locking system is in a locked condition, the staple assembly having a projecting staple member that projects forward from the door or access panel, the staple member having a shackle opening for receiving a shackle or lock pin of a padlock, and wherein the strap members are provided with apertures for receiving the staple member when in the locked condition;
B is the staple assembly is formed from cooperating staple members that are provided on the inner ends of the first and second strap members, the staple members each having a staple opening that is aligned with the other for receiving a shackle or lock pin of a padlock when in the locked condition; and
a cover mount assembly comprising:
at least one cross member having opposite first and second ends that is configured for extending across an upper wall of the enclosure;
at least one cover mounting bracket that is coupled to a portion of the enclosure located on one side of the upper wall, the first end of the at least one cross member coupling to the at least one cover mounting bracket; and
a cover mount strap member coupled to the second end of the at least one cross member, the cover mount strap member being provided with an aperture for receiving the staple member or cooperating staple members when in the locked condition.

11. The enclosure and locking system of claim 10, further comprising:
a lock shroud that is non-releasably coupled to at least one of the inner ends of the first and second strap members, the lock shroud being configured to surround a padlock, or shackle or locking pin of a padlock when secured to the staple assembly to facilitate prevention of tampering with such padlock.

12. The enclosure and locking system of claim 10, wherein:
the opposite portions of the enclosure are opposite sidewalls of the enclosure.

13. The enclosure and locking system of claim 10, wherein:
the inner end of each strap member overlies the door or access panel when the door or access panel is in the closed position.

14. The enclosure and locking system of claim 10, wherein:
the enclosure has a projecting power plug; and
at least one of the first and second side mounting brackets includes a power plug guard or shroud having a central opening for receiving and accommodating the projecting power plug of the enclosure.

15. The enclosure and locking system of claim 10, wherein:
the cover mount assembly further comprises a second cross member that is oriented transverse to the at least one cross member for extending transversally across the upper wall of the enclosure.

16. The enclosure and locking system of claim 10, wherein:
at least one of the first and second locking strap members is formed from two members that are pivotally coupled together.

17. The enclosure and locking system of claim 10, wherein:
the staple assembly is A.

**18**. The enclosure and locking system of claim **10**, wherein:

the enclosure comprises a main enclosure and a projecting sub-enclosure that projects from a portion of the main enclosure; and wherein

at least one of the first and second locking strap members is formed from two members that are pivotally coupled together, at least one of the two members of said at least one of the first and second locking strap members overlying the sub-enclosure.

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